

SYSTEM AND METHOD FOR INFORMATION TRANSFER OVER A
NETWORK

DESCRIPTION

BACKGROUND OF THE INVENTION

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Field of the Invention

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The present invention is related to transferring remotely stored data across a network and, more particularly, to transferring objects across a network to a local computer from a remotely connected computer and displaying the transferred data.

Background Description

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Computers running software referred to as web browsers for connecting to a remote computer system, retrieving the contents of a database on the remote system and visually displaying the retrieved data on a local client system, are well known in the art. Typically, images are requested by a web browser user on a client computer system. The remote system receiving the request, retrieves the images from the database and transmits the images across what is commonly referred to as the internet or world wide web (www). The apparent speed of the transfer is directly proportional to the amount of data that must be transferred. Accordingly, to improve apparent transfer speed, reduce the amount of time

that the user must wait for the transfer and to minimize web traffic congestion, data reduction or compression methods are constantly being sought.

Thus, there are various well known data
5 reduction standards such as those referred to as JPEG, TIFF and GIF for images, MPEG for movies and RP3 for sound. However, even employing these well known standards, transferring data required to present a relatively simple image may cause a
10 significant delay, thereby resulting in inactive or dead time at the client system. Accordingly, there is a need for data compression methods for improving internet image transfers.

SUMMARY OF THE INVENTION

15 It is a purpose of the invention to decrease net workload;

It is another purpose of the present invention to decrease apparent time required to pass information over a network;

20 It is yet another purpose of the present invention to decrease apparent time to load web pages while still maintaining page aesthetics;

It is yet another purpose of the present invention to off-load server storage of information.

25 The present invention is an interface device for connecting to and retrieving data from a remote computer system, and a method of compressing, decompressing and transferring data therefor. A

user may set transfer constraints on the interface device. The interface device may be a web browser. The user selecting a web site requests data, often image data from a remote computer system. The
5 interface device includes a cache memory where generic objects may be stored. Each generic object corresponds to an original object in the requested data. Depending on the data transfer constraints, instead of retrieving the entire image, e.g., web
10 page image, unaltered from the host system, a skeletal image is retrieved, initially, wherein generic objects are substituted for each corresponding original object. A pseudo-image is displayed, with the generic objects substituted for
15 corresponding original objects. Subsequently received original objects may be substituted for generic objects as each original object is received.

Additionally, as selected, a web page is displayed using generic codes previously cached in prior downloads. Thus, the generic coded
20 information is made ready, but is not played or displayed until a link to the web page is selected. Upon link selection, the information is presented so that user observes it while waiting for the new page
25 to be downloaded to the browser. This enhances web browser operation by causing the performance of useful or pleasing audio or images for the user during the wait period, that typically occurs between link selection and viewing, i.e., during
30 downloading. The downloaded image may be a hypertext document represented by text or images. The codes may include wave files or other sound

files such as rp3 files. Thus, generic codes for music, advertisements, copyright information, and the like may be included.

BRIEF DESCRIPTION OF THE DRAWINGS

5 The foregoing and other objects, aspects and advantages will be better understood from the following detailed description of a preferred embodiment of the invention with reference to the drawings, in which:

10 Fig. 1 is a flow diagram of the preferred embodiment system for sending, receiving and displaying Code over the internet.

15 Fig. 2 shows normal browsing of a web site according to the preferred embodiment of the present invention.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

As used herein, Information refers to images, audio, animations, 2-D and 3-D graphics, and other data transferred over a network; Generic Information refers to common or standard Information that usually resides on both a client system and a remote system; Code refers to text, numbers, or other compact identifiers for Generic Information.

20 Further, Generic Information may be stored in a database on a compact disk (CD), digital versatile

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disk (DVD), a hard-disk, a company server or, an internet service provider (ISP) hub.

Generic Information may include sketches, clip art images, cartoons, commonly used images (e.g. forests, animals...), melodic sequences, 3-D graphics for virtual reality environments, tactile information for virtual reality environments, wave files, etc. A Generic Information database is a library of numerous useful images and sound waveforms that might be supplied for example when a user purchases something on-line or downloads web pages on a web-browser.

Referring now to the drawings and, more particularly, Figure 1 is a flow diagram of the preferred embodiment system for sending, receiving and displaying Code over the internet. Accordingly, in step 100, a user connects to a remote web site and begins browsing remote Information using a client web browser. Constraints may be placed on the web connection session by the user, the ISP, the remotely connected host, or internet related variables.

Accordingly, in step 102 the user may direct the client system to estimate network congestion by pinging the remote host on which the Information resides. Alternatively, the client web browser may generate an estimate concerning remote information access, generated by analyzing the user's past access times to the same remote host or, by

considering other relevant parameters such as time of day or remote host's country of origin.

In parallel with the traffic estimation step 102, the browser or other related software is 5 checked to determine whether the user has placed the client browser in quick mode in step 104. In quick mode, the browser is to present only Generic Information, making detailed information superfluous. Alternately, in step 106, the client 10 may have been placed in quick mode by the ISP or, for example, by parental control software; or, the remote host server may limit transfers to sending Code, so as to reduce demand on the server.

It should be noted at the outset that, in step 100, the user may specify an importance level of 15 Information to be requested. In this case, in step 108, the client system determines "importance" of the coded information. If the importance level is high, then, in step 110, the host server sends 20 larger specific Information rather than Generic Information. Importance may determined by the user, the client, the ISP, the provider of the remote host Information, or determined by algorithm on the client system. For example, importance may be based 25 on criteria such as the number of times the information has been accessed in the past, the subject matter type, specific instructions provided by web browser users or, latent semantic indexing.

If the importance of the requested Information
is determined, as previously described, in step 108
to be high; or, based on the traffic estimation
results in step 102, if network traffic is not
5 congested in step 112; or, in step 114, it is
determined that the user has not selected quick
mode; or, in step 116, it is determined that the ISP
or network conditions have not placed the browser in
quick mode; then, in step 110, the browser presents
10 the web page normally. If, however, network traffic
is congested in step 112; or, the browser or server
is in quick mode in steps 114 or 116, respectively;
then, in step 118, a transfer is initiated for the
Code for Generic Information rather than the larger
15 more specific web site specific Information.

In step 120, the remote host server returns the
more compact Code to client. The Generic
Information specified by the Code may include object
specific characteristics such as color as well as a
20 particular object's location or a location relative
to other Generic Information. Along with Code for
the current web site image, in step 122, the client
receives Generic Information Codes corresponding to
related images, e.g., web pages linked to the
25 current web page.

As the Code is received by the client, in step
124, the client system checks to determine whether
the Code and any accompanying Information already
exist in any local client database. Optionally, if
30 the Code and Generic Information does not exist

locally, then, in step 126, the client requests that
server send Generic Information and Code to the
client for current and future use. At the user's
option, this step 126 may be ignored. Finally, in
5 step 128, the client web browser presents the
Generic Information (associated with Code) to the
user.

The flow diagram of Figure 2 shows normal
browsing of a web site according to the preferred
10 embodiment of the present invention. Once the
current web page is loaded by the browser, in step
130, the user browses the displayed Information.
Next, in step 132, while the current web page is
browsed, the remote host server sends next page
15 Codes, which are cached at the browser. Information
corresponding to the concurrently received Code is
not displayed nor otherwise performed at the
browser, but merely cached for subsequent use.
Then, in step 134, the user selects another linked
20 page for browsing. As the host server is
transmitting data for the selected web page, Generic
Information corresponding to the previously cached
Code may be displayed or performed in Step 136.

Thus, the Coded Information is played or
25 displayed while waiting for the next page. Thus,
the web browser operation is enhanced by providing
pleasing audio, images or other Information, which
the user observes during the normally dead period
between linking to the web site and downloading all
30 of the hypertext document as represented by text or

images on the current web page. The Codes may be, for example, code for music, advertisements, copyright information, and the like. Other generic objects may include trees, roots, houses, a kitchen, 5 a wall in a house, the side of a house, hotel, city, street, the sky or the sea.

EXAMPLES

A user, attempting to browse a remote web page, enters the page's URL into a web browser. The 10 client system determines that the network is very congested in step 102 and, rather than download actual images from the remote host, selectively downloads a Generic Code for a generic image, which is subsequently displayed. So, in this example, 15 while specific hyper text markup language (HTML) may specify a full image of a particular dog, may specify the Code for a generic dog image, cached in a prior download or residing in the user's local database of 20 Generic Information. The browser uses these codes to lookup generic images in the user's database and substitutes these when the web page is displayed.

In another example, a first user wishes to send a digital photo of himself standing in front of a 25 beautiful mountain range; an advertiser wishes to send a photo of a new car in front of a starry sky. These users may specify a background scene using simple English, such as "mountains" or "starry sky." These English words are the Codes for generic 30 images. Using image processing software, these

specific foreground images may be merged with the specified generic code to create the final scene.

In yet another example, at 4:00pm, a user participating in a virtual-reality chat room has audio, visual and tactile feedback. The chat room topic is kaleidoscopes. The user's system detects that exact tactile and audio components are unimportant to the chat. Additionally, it is the peak network traffic period, which causes receipt of a byte Code specifying Generic Information to be sent to the user. Responsive to the byte code, generic muzak is played while the user is presented with a generic oscillating sensation.

Accordingly, the present invention is applicable to network transfers on systems such as personal computers connected to an ISP server or any remote computer. Also, the present invention is advantageous for smaller computing devices where memory and display resources are a premium such as embedded devices, personal digital assistants (PDA), a web phone, a smart wallet, a digital pen, a camera and the like.

While the invention has been described in terms of preferred embodiments, those skilled in the art will recognize that the invention can be practiced with modification within the spirit and scope of the appended claims.